

Claims

- [c1] 1. A coating system on a substrate, the coating system comprising a beta-phase NiAl intermetallic overlay coating comprising inner and outer regions, the inner region containing more chromium than the outer region.
- [c2] 2. A coating system according to claim 1, wherein the inner region of the overlay coating contains, by weight, about 5% to about 20% chromium, and the outer region of the overlay coating contains, by weight, about 1% to about 5% chromium.
- [c3] 3. A coating system according to claim 1, wherein the overlay coating contains nickel, aluminum, chromium, and zirconium and optionally one or more of hafnium, yttrium, titanium, tantalum, silicon, platinum, rhenium and ruthenium.
- [c4] 4. A coating system according to claim 1, wherein the overlay coating consists of nickel, aluminum, chromium, zirconium, and incidental impurities.
- [c5] 5. A coating system according to claim 1, wherein the inner region of the overlay coating consists of, by weight, about 20% to about 30% aluminum, about 5% to

about 20% chromium, about 0.2 to about 1.5% zirconium, the balance nickel and incidental impurities.

- [c6] 6. A coating system according to claim 1, wherein the outer region of the overlay coating consists of, by weight, about 20% to about 30% aluminum, about 1% to about 5% chromium, about 0.2 to about 1.5% zirconium, the balance nickel and incidental impurities.
- [c7] 7. A coating system according to claim 1, wherein the inner region of the overlay coating contains about 10 weight percent chromium.
- [c8] 8. A coating system according to claim 1, wherein the outer region of the overlay coating contains about 2 weight percent chromium.
- [c9] 9. A coating system according to claim 1, wherein the outer region of the overlay coating contains more aluminum than the inner region
- [c10] 10. A coating system according to claim 1, wherein the inner and outer regions are discrete layers of the overlay coating.
- [c11] 11. A coating system according to claim 1, wherein the inner and outer regions are not discrete layers of the overlay coating.

- [c12] 12. A coating system according to claim 1, further comprising a thermal-insulating ceramic layer adhered to the overlay coating.
- [c13] 13. A coating system on a gas turbine engine component, the coating system comprising a beta-phase NiAl intermetallic overlay coating, the overlay coating comprising an inner region and an outer region that defines an outer surface of the overlay coating, the inner region consisting of, by weight, 20% to 30% aluminum, about 5% to about 20% chromium, about 0.2% to about 1.5% zirconium, the balance nickel and incidental impurities, the outer region consisting of, by weight, 20% to 30% aluminum, about 1% to about 5% chromium, about 0.2% to about 1.5% zirconium, the balance nickel and incidental impurities, the inner region containing more chromium than the outer region.
- [c14] 14. A coating system according to claim 13, wherein the inner region of the overlay coating contains about 10 weight percent chromium.
- [c15] 15. A coating system according to claim 13, wherein the outer region of the overlay coating contains about 2 weight percent chromium.
- [c16] 16. A coating system according to claim 13, wherein the

outer region of the overlay coating contains more aluminum than the inner region.

[c17] 17. A coating system according to claim 13, wherein the outer region contains at least 18 weight percent aluminum and the inner region contains not more than 18 weight percent aluminum.

[c18] 18. A coating system according to claim 13, wherein the inner and outer regions are discrete layers of the overlay coating.

[c19] 19. A coating system according to claim 13, wherein the inner and outer regions are not discrete layers of the overlay coating.

[c20] 20. A coating system according to claim 13, further comprising a thermal-insulating ceramic layer adhered to the overlay coating.